

AMENDMENT UNDER 37 C.F.R. § 1.111
USAN 09/993,623

REMARKS

Claims 1-8 are all the claims pending in the application. Applicant amends claims 1, 3 and 8, submits corrected formal drawings, and amends the specification for clarity per the Examiner's requests.

With respect to the prior art rejections, it appears that the Examiner relies upon Applicants' admitted prior art of Figures 20+ to show conventional alternator structure, including a conventional housing and typical brush members. The Examiner relies upon Csaki and Fiorenza to show devices in which provision has been made for removal and replacement of the brushes. Both of these patents relate, however, to electric motors rather than generators.

The Csaki patent shows a configuration in Figure 1 wherein the brush members 14 are housed within a support 15 and biased by means of a spring 16. The patent does not describe how the brushes are replaced, but Figure 1 appears to indicate that the brushes would be accessible by means of an unnumbered cover above the support 15.

The Fiorenza patent also relates to the brush structure for an electric motor. In this device, the brushes are removed and replaced in the axial rather than radial direction. As best seen in Figure 4, a brush carrier 115 is secured to the end bell or housing 295 of the electric motor by screws 485 which permit the assembly 115 to be axially affixed or removed. The carrier 115 is in turn surrounded by a cover 130 which is affixed to the brush carrier 115 via a single central screw 185. After removing the brush carrier 115 as shown in Figure 4, presumably the brushes 210 may be removed and replaced.

Although the prior art does show a recognition of the need to replace the brushes without wholesale dismantling of the involved motor or generator, the cited references do not discuss the details of such and importantly do not use elements of the removable or replaceable components to address airflow or cooling concerns within the device. Claim 1, as amended, makes clear that one of the cap and case serve to direct airflow within the alternator to the vicinity of the brushes. This functionality is unknown to the prior art, and thus the presently constituted claims are believed clearly patentable thereover.

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In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

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The present invention aims to solve the above problem and an object of the present invention is to provide an alternator that facilitates the operation of replacing the brushes, [and] which alternator has improved cooling efficiency and a small size.

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This alternator includes: a case 33 composed of an aluminum front bracket 1 and an aluminum rear bracket 32; a shaft 6 disposed inside the case 33, a pulley 4 being secured to a first end of the shaft 6; a Lundell-type rotor 7 secured to the shaft 6; [a fan] fans [35 secured to the shaft 6 outside the case 33] 5a, 5b rotatable with rotor 7; a stator 8 secured to an inner wall within the case 33; slip rings 9 secured to a second end of the shaft 6 for supplying electric current to the rotor 7; a pair of brushes 10 which slide on surfaces of the slip rings 9; wires 17 each having an end portion connected to these brushes 10; springs 16 for pressing the brushes 10 toward the slip rings 9; a brush holding assembly 61 having a holding portion 64a for housing the brushes 10 and a cover 64b removably disposed on a head portion of the holding portion 64a; a rectifier 12 which is electrically connected to the stator 8 for converting alternating current generated in the stator 8 into direct current; a regulator 13 secured to the brush holding assembly 61 for adjusting the magnitude of an alternating voltage generated in the stator 8; and a cooling plate 14 placed in contact with a secured to the regulator 13 to dissipate and cool heat generated in the regulator 13.

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In the automotive alternator of the above construction, because the open portion 50 is formed in the position on the case 33 facing the cover 64b of the brush holding assembly 61, replacement of the brushes 10 may be performed simply by removing the cover [61b] 64b and the screws secured in the screw apertures 53 from the brush holding assembly 61, and there is no necessity to go to the trouble of disassembling the alternator. Also, because a connection portion connecting the holding assembly terminals 63 of the brush holding assembly 61 and the brush terminals 62 is disposed in the open portion 50, whereby the open portion 50 forms a space for the connection operation, therefore, connection of the holding assembly terminals 63 and the brush terminals 62 can be performed easily.

IN THE CLAIMS:

The claims 1, 3 and 8 are amended as follows:

1. (Amended) An alternator comprising:

 a case;

 a shaft passing through said case;

 a rotor secured to said shaft, said rotor including a rotor coil for generating a magnetic flux on passage of an electric current therethrough, and a plurality of claw-shaped magnetic poles extending in an axial direction and [covering] radially surrounding said rotor coil, said claw-shaped magnetic poles being magnetized into [North-seeking (N)] North and [South-seeking (S)] South poles by said magnetic flux;

 a stator including a stator core provided with a plurality of slots formed so as to extend axially and be spaced circumferentially, and a stator winding mounted to said stator core;

 slip rings secured to said shaft;

 brushes, the ends of which slide on the slip rings, supplying electric current to said rotor coil through said slip rings from an electric power supply;

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a brush holding assembly [which said shaft passes through], said brush holding assembly holding said brushes within a holding portion and provided with a cover capable of being opened to remove said brushes; and

a cap for closing an open portion of said case for removal and insertion of said brushes, said open portion being formed at a position on said case facing said cover, one of said cap and said case including means for directing airflow in the vicinity of said brushes.

3. (Amended) The alternator according to Claim 1 wherein a regulator for adjusting the magnitude of an alternating voltage generated in said stator, and a cooling plate placed in contact with said regulator, are disposed on said brush holding assembly [so as to overlap each other on the non-rotor side of said brush holding assembly].

8. (Amended) The alternator according to Claim 1 wherein [a conducting wire] conductors of said stator winding [extends outwards] extend outwardly in an axial direction from an end surface of said stator core and [is] are formed into coil ends having a uniform shape in a circumferential direction.